UNIVERSITY OF GENOA
DEPARTMENT OF INFORMATICS, BIOENGINEERING, ROBOTICS AND SYSTEMS ENGINEERING
MASTER'S PROGRAM IN BIOENGINEERING

# Thesis Project Form

**Title (tentative):** Development of a sensorized ventouse to investigate the learning of operative delivery maneuvers

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## Description

**Motivation and application domain**

Vacuum-assisted delivery, also known as ventouse extraction, occurs in 5-10% of the deliveries. As this maneuver is not frequent, but is far from being rare, it is crucial that gynecologists and midwives are properly trained on when and how to use it and know its limits and possible complications.
A possible way to train students is through simulation. However, studies on simulation-based training for operative delivery, particularly ventouse extraction, are sparse and there is not clear evidence on how to implement these trainings.

**General objectives and main activities**

The aim of this thesis is to sensorize a ventouse in order to monitor userâ€™s performance during a manikin-based training. This includes tracking the trajectory of the ventouse, monitoring its position, and the force applied during extraction. This system has a dual function:
- It offers trainees an educational tool that provides real-time feedback on the force used in simulated births and aids them understand trajectories of the ventouse
- It is a research tool to investigate the learning processes associated with ventouse extraction

The project includes a design and development phase with preliminary tests of the system. Then, the student will carry out an experiment with midwife students and gynecology residents, to investigate how performance metrics (i.e., trajectory, position and force applied) change as a result of multiple repetitions of the task in a manikin-based simulation environment.

**Training Objectives (technical/analytical tools, experimental methodologies)**

- Understand how to select and use sensors and microcontrollers
- Define a hardware/software architecture, including sensors, and communication.
- Assembly/manufacture the hardware components
- Design and develop a system for medical training and evaluation
- Run Experiments involving clinicians in a medical simulation environment
- Analyze data
- Work with a multidisciplinary team made of clinicians and engineers

**Place(s) where the thesis work will be carried out:** Joint lab For Emerging Technologies in Simulation @SimAv

Via Pastore 3

## Additional information

**Maximum number of students:** 1